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The Art of Die-Making

J. A. Richards

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J. A. Richards



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Preface

In compiling this book the author does so with the sole aim of passing on to his fellow craftsmen the knowledge he has acquired in the making of dies for all kinds of fancy booklet, catalog and program work, as well as the cut-out advertising matter that is ever increasing in popularity throughout the world. And while there may be, and no doubt are, many die makers who could put up a much better series of lessons, it remains for them so to do, and the main object is to keep them as simple in explanation as possible, so that they may be readily understood by the man who has not the slightest idea of the work beforehand.

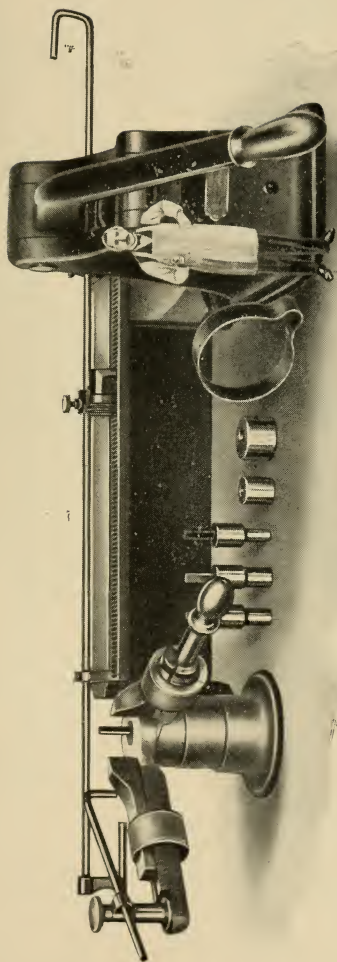
It is hoped that those who read this book, and have better knowledge of the ways of doing any of the operations herein set forth, will confer a favor upon the trade by sending in their method or manner of doing the particular thing in question, and it will be gladly given space in the next edition of the book.

This is the second edition of "The Art of Die Making," and it has already grown to more than twice its original size in number of pages. It will be reprinted from time to time, and sent free of charge to all firms who have a "Multiform" Outfit in their establishment.

A "Multiform" Outfit should be a common fixture in every shop in the country, so great is its every-day usefulness.

Sincerely,

J. A. RICHARDS.



“MULTIFORM” OUTFIT



YOUR INSPIRATION

Art of Die Making

MATERIALS

Buy from the J. A. Richards Company, or if you have bought a "Multiform" Outfit, you are already in possession of a Rule quantity of soft steel cutting rule, which is commonly used by all box makers the world over, and who consider the die making a very simple part of their business. The price of this rule in small quantities is 10 cents per foot in 30-inch strips, but reduced prices prevail when large quantities are bought. It is made in several different thicknesses and heights, but is commonly used for die purposes, such as cut-out work requires, in 2-point body, .937 thousandths high, and for fine fancy dies 1½-point body in .937 high. Also the same thicknesses can be secured in a lower height (.918), which makes the half-cut through, as for fancy lamp shade work, etcetra. It has for general uses three different degrees of temper, namely: hard, medium and soft, but we recommend only the medium and soft for all fancy work dies, and only the very hard rule, where the run is a long one of hundreds of thousands and cutting heavy stock, in which case hard rule can be used if the die is not too fine lined for the working of such hard rule, which will not stand the small bending that the softer

rules will. And in this connection it is a matter of argument among box makers who have extremely long runs, as to whether the soft rule is not the best, because it is tougher and does not break down as easy as the hard, carboned rule. Experience will have to be your teacher to suit your own judgment, but the rule you receive with the "Multiform" Outfit will start you on the right track.

It has never been the author's experience to wear out a die so far that it required renewing, even when making as high as 100-M impressions on six-ply stock. If a die falls down, or becomes so dull that it will not cut, replace the bad piece with a new one, or sharpen it a little, if it is only at some one point in the die.

For the box maker there is a regular brick cork that comes in large pieces which can be cut up to suit the workman's need as
Cork he proceeds in the making of his dies, but for the printer who is making fancy dies for cut-out work, it is the author's experience that the small, round corks that may be bought of us, or any bottler's supply house, are the most convenient and satisfactory to use, and we have ours made to order, samples of which you received in your Outfit. Other die makers sometimes argue for the advantage of spring rubber for the dies, but it costs more, and you do not feel like leaving it in the die when it is put away, while it is not any better in our estimation than the cork.

This cork is used to push the stock back out of the die after the impression has been

made, and we are lead to make this very simple statement, because of the fact that the question is asked almost universally by those who see a die for the first time. The stock does not go through the die at all like it does in a solid steel die. One writer asked us how the trimmings got out through the back of the press, even after reading "The Art of Die Making," so we make this statement to enlighten those who are of a similar mind.

In an office that has not the convenience of a scroll saw, although there is no excuse for this, as they can be bought
Plaster of Paris from \$15, up to any price you wish to pay, it is quite convenient to use plaster of paris in the making of dies, and the plaster die is so simple, that for all designs that are not made up from plates, that would require the most exact die, it is about as easy to make a plaster die as it is to saw a wood form, and many of our most catchy designs are in plaster. The common ordinary plaster of paris is used for this, that you may procure at any drug and most hardware stores, and most economically in 10-lb. lots.

There are many kinds of boards that can be used, and all have their merits; but for ordinary work a good-seasoned
Die Board hard wood of smooth grain is all that is necessary, though we handle board in the laminated kind, as listed elsewhere in the book, and also in the very best beech, which is made especially to our order by the Hamilton Mfg. Company, and cannot be surpassed for beautiful working

qualities. The laminated, which is made up of five thicknesses crossed, is most desirable when making a fine die, and it can be secured in almost any size desired and cut up to suit the required die. The beech comes in assorted sizes (see list). It is 11/16ths thick for general purposes. We enclose samples of this wood with all "Multiform" Outfits.

A small tube of liquid glue, a piece of chalk or scratch-all, and a **Bright, Young Man**, will complete the needed materials
Miscellaneous to do a line of die work that will bring you in praise and profits from your customers.

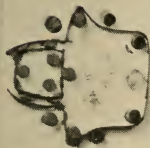
It is, of course, out of the question to make a success without the great machines that bend and cut the rule
"Multiform Outfit" into any desired shape, but we presume, as a reader of "The Art of Die Making," you are in possession of these already.

Making the Die

If it is a subject that has been sketched up with the pencil, and is not required to follow arbitrary lines, or is a small job **Plaster Die** that will be used on a few short runs, where the die will not get rough handling and be dropped or broken, you can make a plaster die, as noted in the material list. Dies made in this manner are quite as substantial as a wood form die, and will last just as long, but they will not stand to be thrown across the house. It is sometimes much easier to make a plaster die than it is to make a wood form die, and after a time in the work you will make first one kind and then the other, and the question will be asked you from time to time why you do so. The answer is simply "Judgment."

To start in, have your print before you, or your drawing, or a pencil outline of what you are to make; then take a knife or shears and cut it out, as you expect to have it when it is complete, avoiding the very small bends as much as possible in order to save yourself work, and you will find that the little corners do not have to be near as fine as you at first think they should be. Now, take a long breath and decide which way you want the design to face—right or left. If it is to be made from a plate that has irregular sides, you must be sure that you make your die in the right way, so it will cut from the right side, or you will be very likely to wake up after you are all done and find that you have

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it made upside-down, or just the reverse of what it should be, which would mean that all of your work was for nothing. So if it is an arbitrary subject, and can have but the one way of facing, you must turn your **design face down** on the stone or bench, and keep it in that position while you bend your rule to go around it, **having the cutting edge up**.

Do not think that you must have the rule all in one piece, because, while this is all right if it is easily practical, it is by no means necessary. By having the ends of the rule come together, with even an ordinary match, the die will cut the stock in good shape and leave scarcely any thread. It is well, however, to get the habit of matching your rule in a close manner by taking a small hammer or the quoin key and offsetting the face so that the shoulder is on the one side only at the meeting point in the case of angles, making them come together the same as the regular brass rule that has only the one side shoulder.

After you have the rule all bent with the "Multiform" Outfit, the next thing is to prepare the chase for making the cast.

If you are making a die that you wish to use as quickly as possible, you can greatly aid the setting of the plaster by placing a sheet of heavy tag board beneath the entire chase so that it will absorb the moisture out of the plaster quickly. Now take the lubricating oil can, and selecting the proper sized piece of furniture that will make one side of the die, and allow a half to one inch margin outside of the rule, to make the die strong and in one good solid piece after it is cast, oil up the

piece thoroughly, and do so with the other pieces that are to go around the inside of the frame around the die. Place your quoins in position and have everything in shape so that after the plaster is set you have simply to tighten up the quoins a little and your die is ready to lift.

Now position your rule inside of the frame thus made, and if any of the pieces will not readily stand up, you can put an old quad on each side of them which, if you do not want to leave them in, you can oil and push out afterwards, if the nick is faced next to the rule, so the plaster will not hold them. Another good way to make some pieces stand up is to bend an angle on them at the end where they cut out into the margin or trim. This angle will make the rule stand up, and while it will cut the same as the rest of the die, it can do no harm, as it will be outside of the part preserved.

You do not always need to break the rule in order to break the cut, as you can leave it run by and then file off the face where you wish it to be uncut. This will be found a very convenient way in many cases, instead of having several small pieces. The same idea as in perforating rule.

Now take a suitable pail or vessel that will hold enough plaster to make the entire cast all at one time (it is better to have too much than not enough), as more than one batch in the same die will seldom knit together, and therefore it will not make a good, substantial die. Mix the plaster by putting it into the vessel and letting enough water run in to

thoroughly moisten it, and get it mixed up so as to have no lumps of dry plaster; then thin it down to a consistency that will allow it to pour readily, more or less thin, according to the size of the small pieces that you have in the die, so that they will not be knocked down by the mixture being too heavy, and moving the rule from its position. To avoid this you must pour on all sides at the same time, raising the level of the plaster at all sides equal. A nice way to do this is to have a small funnel to pour through, and you can direct the flow to any place with ease and accuracy. Pour the plaster until it has filled up to the height of the furniture and then smooth it off nicely.

Now, before the plaster sets too hard, take a number of the small corks that you have at hand and press them down into the plaster at several places inside and outside of the rule; for instance, at all corners and narrow places that will be apt to hold the stock. Do not be afraid to have too many corks, and leave them to project above the rule about an eighth of an inch more or less, according to the resiliency of the corks used, but give them plenty of push. These corks, as stated in the material list, are to push the stock out of the die after it has been cut by the press, and it would be impossible to get the stock out without them. Use plenty of cork and save time in make-ready and running.

After you have the die all cast, and the corks positioned, let it stand awhile until the plaster has thoroughly set and become hard; then you can raise it up and aid the drying by

placing it near the radiator or stove awhile.

Do not use straw board under the die, as it will warp so badly it will be apt to throw the rule off its feet. It is best not to use anything under it, and you can make a very quick setting die by not getting the plaster too thin.

In making plaster dies, if these instructions are followed carefully, you will soon become adept at the work and think nothing of making almost anything that you may need in the shortest possible time, with the "Multiform" Outfit to do the difficult part.

After you have used the die for the job it was made for, put it away as a constant asset in your office, to be picked up as "velvet" some day for another job.

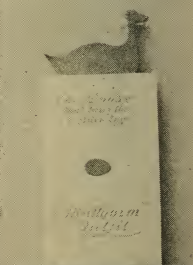
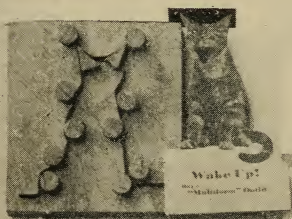
The method of procedure in making a wood die is not much different than the plaster die, except that it is not quite as
Wood Dies dirty and, if anything, a little more simple. Take up the proper size piece of die board, and glue or paste your design or print, or engraver's proof, upon it—**face up**—(not face down, as in the plaster die); then proceed and saw it out in a good, workmanlike manner, after boring a small hole to put the saw blade through to start it, in order not to break the outside margin. If you have not a scroll saw such as any one of the many kinds we sell (you should have), you can send it out to any cabinet maker and get it sawed after once going along to tell him just how you want it. If the mill has only a band saw, and cannot make some of the very small bends that you may desire, have the operator saw one block,

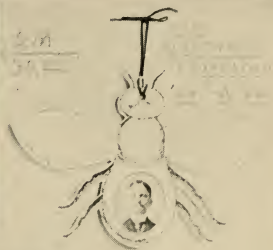
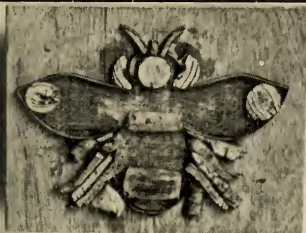
A FEW WOOD FORM DIES

"MULTITORM" PRODUCTS

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preserving the inside; and then another one, preserving the outside part, with enough space between them to admit the insertion of the cutting rule. In this way there is no bend or angle too small to be obtained, even on a coarse-bladed saw, and anything can be made. (Always saw just inside the line to allow for variations and bevel on rule.)

After you have the die sawed out you must consider the way you will put in the rule. There are two ways you may do this: One is to turn the entire die board over and put in the rule face up, and the other is to leave the print face up, just as it was when sawed, but put the rule into the wood with the face down. The latter way is the most general custom, and the best, as it is easier to drive the rule into the wood because of the bevel edge. The reason for putting it in face down, when the print is face up (just the opposite of the print), is the same as the fact that type is backwards from the printed impression and, of course, a die must be the same in relation to the print as type. This is one of the points that you must keep constantly in mind in making your first dies.

When you decide which way you will put the rule in, lock the board into a chase and draw the quoins up just enough to protect the wood from being forced out of shape. If you are going to drive the rule in, face down, it is well to put a piece of card board on the stone, or rather to work on a wooden-topped bench, in order that the cutting edge of the rule may not be injured unnecessarily.

Now, with the "Multiform" Outfit, bend

and cut your steel rule to fit all of the cracks where the saw run, and match them up nicely, as noted in the plaster die instructions, and with the liquid glue attach your corks to the wood in all places where it seems there would be a chance of the stock sticking.

As an aid to forming the rule to fit the design, it is often a good plan to cut out a cardboard pattern that you can hold above the machine and form the rule to it. The wood die has this advantage over the plaster die, in that you do not have to be so accurate in the bending, because the wood will draw the rule to correct position if it is nearly so when driven into the form.

If you wish to have any scoring rule in the die for folding it in any way, why of course you can place it in the same as if it were a cutting rule, and make ready for it accordingly.

Always use the soft rule when making a complicated die, as it works much easier and will bend much shorter curves and angles.

The J. A. Richards Company has cutting rule that is **right**.

There are many little ways and points that you learn as you become accustomed to the work, but on the first dies you make take plenty of time and do not make the mistake of bending your steel the wrong way or upside-down, which you will be very apt to do if you are not careful, as a die must be reverse, the same as type.

If the die is for a job of only a few impressions, and both sides alike, it perhaps would be economy to make only half the die and

run the job through twice, cutting first one and then the other side, by simply turning the stock over.

Buy a small steel scratchall at the hardware store to use in marking your points of bending, or a small piece of white chalk will do.

Do not hesitate to make a break in the rule if it is not easy to have it one piece, as working with the shorter lengths is much more convenient and makes no material difference in the cutting face of the rule.

For example, if you have a subject that is similar to the bunch of grapes shown in the illustration on page four, do not try to make several of these curves in one piece, but let each curve be a single piece. In this way you not only make the work easy, but you make the points clean cut, which it would be almost impossible to do if the rule was not severed at the reversing points

Do not forget to offset the face as previously suggested in making a good match of the rules where there are angles; in fact, see that all joints come together nicely, and do this as you go along, each piece as you make it, and thereby get the habit of having the die finished up to the last point always, which will save time in the end by obviating the necessity of going over the work and pulling out some one piece after you are all through.

After you have the die all finished, if it is a large one and is made with more than one piece of board, take the little staples you have bought for this purpose and fasten it all together. It is well to remember in this con-

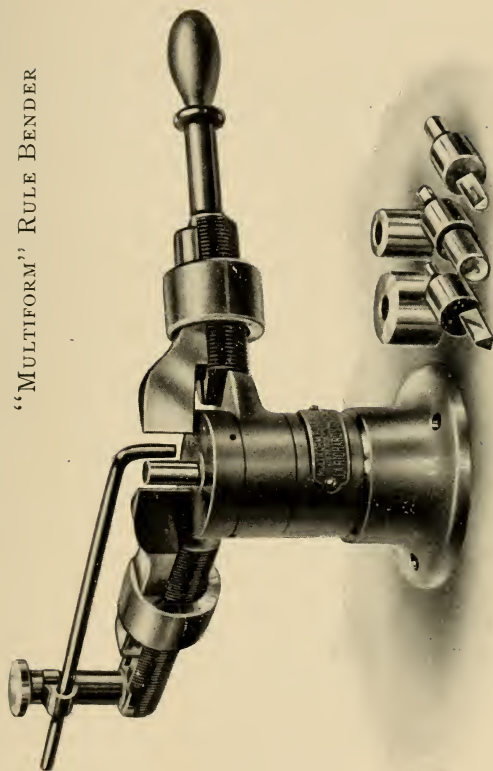
nection that you can sometimes get the inside pieces all out of a board, and if you do not have any margin for the outside you can put on another piece running crosswise of the grain of the inside piece, thereby strengthening your die. It is only necessary to match up the joining edges nicely so as to make the die flat and not bulging. But the best way is to have a board large enough, and our laminated board can be bought in any size.

We show several pages of illustrations of wood and plaster dies and their products, and while all of them are simple subjects, remember that practically all of the cut-out work made today, both in lithographed and printed display, is made from "Multiform" Dies, and the die making is the simplest part of the work. Order your equipment at once if you do not already own one.

A very simple way to make circular dies is to take the proper die board, and if you want more than one circle lay them off on the board and find the centers, and then with an expansion bit (which can be bought at the hardware store for \$1.25) bore out the holes, first testing the size in some other piece of soft wood, after which you can roll your steel on the Bender and cut it on the cutter to exactly fit the holes, and drive it in so as to make perfect circles without being so particular in bending it. For the inside filling you can pour in a little plaster of paris, and stick in a cork or so, according to the diameter of the die, and you have it ready for the press. The author has made made dies in this way with as high as sixteen circles in a board; for

instance, with eight 2-inch and eight $1\frac{3}{4}$ -inch circles, all on 2-inch squares, and the same with $1\frac{1}{2}$ and $1\frac{1}{4}$ -inch circles on $1\frac{1}{2}$ -inch squares. A circle that you used to buy from the supply house and pay \$1.00 for, you can make in five minutes with the "Multi-form" Outfit. The expansion bit referred to will make any diameter up to over 3 inches, and when anything larger is desired it is then easy to saw it and save the inside.

“MULTIFORM” RULE BENDER



“Multiform” Rule Bender

(PATENTED AUG 26, 1902, JULY. 18, 1911.
FOREIGN PATENTS PENDING)

Unless the Bender, as part of the “Multiform” Outfit, is to be placed in some room by itself, it is essentially a composing room adjunct, and this is the place for it in any small shop, thereby making for convenience.

It should be mounted upon a strong bench about the height of the ordinary imposing stone, and before screwing down place it in position and mark the base and then in the center of the base make a half-inch hole through the bench to permit of pushing out any die which may become stuck in the machine. The screws that come with the machine can be used in fastening it.

After positioning the bender, make a rack or box to put the dies in, and have it within easy reach. Boring holes in a piece of furniture and fastening up back of the machine makes a handy rack, and by practicing the habit of putting the die back in the rack each time it is used, you will save many precious hours of time and also conduce to speed in working.

A place for the different kinds of rule and other material should also be made.

A drop of oil now and then upon the movable parts will make the machine last longer and be much easier to operate.

Keep the rule on its feet when bending and avoid a springy die. Rule off its feet, especially

in a plaster die, will vary the cutting height.

The making of the design is all a free hand proposition, as the very fact that all cut-out work is original in design is what puts the "Multiform" Bender absolutely in a field by itself for the purpose of making cut-out dies, the 13 dies furnished making any conceivable bend. Simply follow saw slot in wood, the pencil sketch before you, or better yet, cut a card-board pattern to hold in the hand above rule while bending.

In making a bend, or several bends for a die, by starting with a long piece of rule, you need not be changing hands with it in bending in first one direction and then another, but simply turn it over and back again, over and back again, and so on, which is quicker than changing hands to some that are all one-handed, and would use the right hand for the lever hand the most. Of course it is well to use both hands in the working of the lever, thus swinging from one side to the other of the machine, which avoids the necessity of turning the rule face down at any time.

The permanent clamp former is used to clamp the rule against the die and hold it while the lever former makes the desired bend. You must bear in mind that it is not necessary to have the die in one piece, and therefore if you find that you are not able to make a certain shape in one piece make it in several pieces, simply insuring a good match of the ends as you go along. A very small circle can be of two halves.

Always have the movable former lever around to either the right or left extreme position before you clamp the rule against the die. If the rule

is stiff and springy you may have to go over it twice, the first time not forcing up the former head so close as the second time. You invariably have to use a smaller die than the desired size of the finished bend, because of the spring in the rule.

By not having the clamp head up against the die and having the former head also away from it, you can move the rule as you bend a little each time and thereby make a much larger radius than even the largest die, and in this manner of use you can make large bends by having the lever held at a given position and setting the two former heads at a distance from the central die piece to give you the desired radius of bend (test with a lead or slug the radius) and taking hold of the rule pull it through this set position of dies. There is no limit to the size or radius you can make. The central die will usually roll as the rule is pulled through.

The gage can be set at any position on either side of the machine, and in using it you first push it against the central die in order to have it perfectly perpendicular at the end, then move it out to the desired position, which you can measure with a line gage, from the point of the bend to gage. The groove on each side of gage is for the rule to fit in so it will not swerve from its position when the bend is made. You can make as many duplicate bends as desired with the gage to go by, and it will surprise you what beautiful designs can be made with several pieces alike. The gage is of course used more by the box-maker who uses many pieces of a kind, while the

fancy die maker has seldom two pieces alike.

If you are in doubt as to how to secure a certain bend, take a piece of lead or slug and experiment on it, as it is cheaper than rule. Practice makes perfect, and you soon learn that die making is a very interesting and fascinating occupation, and yet simple enough with the "Multiform" Outfit to do the bending and cutting.

If you at any time bend your small central dies by using too much pressure, you can easily straighten them by putting a nail or such object between the former head and the top of the die, and forcing the die back into position with the micrometer. Avoid the necessity of this by using good judgment when bending with the light dies and hard steel.

Remember—a rule die is usually the same as type—that is backwards, and you must constantly watch that you do not bend the rule the wrong way. Have your pattern before you, or better yet, if you are using a wood form, saw it first always, and have it by the machine convenient to put each piece into as you go along, matching the joints nicely.

In making a circle you take a piece of rule of sufficient length; an entire strip if you wish, select the size die that will come nearest to the size circle you wish to make, always smaller of course, because you have to take into consideration the spring in the rule. Put the die in the machine and run the permanent clamp head up to within about 1-16 of an inch from it, place the rule between the clamp and the die and project it through 1-2 inch or so and with the movable for-

mer lever head set up to the distance (that you will soon learn to judge will be correct), make a bend on this end projection, but do not let the former lever pass off the end of the rule, move the lever back again and push the rule forward a little more, again swinging the lever around to bend the additional straight length. After a couple of bends you can judge if the diameter is going to be anywhere near right. If it is too large move the former lever head in closer to the die, and if too small move it out farther from the die, as the distance the head is from the central die will determine the diameter of the bend up to a certain limit with respect to the size die you may be using, as for example the 1 1-2 inch die will make a 3 inch circle perfectly by having the former head at the proper distance from the die, and if you wish to make more than one circle of the same diameter do not change the former heads after you once get them set right. Before rolling the rule around too far cut off on the "Multiform" Cutter the straight end that you could not bend at the start, and if you are making more than one circle after the first one always roll it more than a circle so that you will have a perfect end to start with in make the next one. In making circles the "Multiform" Cutter is an indispensable part of the outfit, because it enables you to cut off the bend after it is rolled on the end of a long strip of rule, which is impossible on any other cutter built. You can fit the circle to the exact size you wish by cutting off more or less of it after you have it made, and yet retain a perfect square match of the ends by

reason of the parallel face on the cutter.

Circles are a cinch when you learn the knack of it, but remember and make little short bends by moving the rule forward each time and swinging the lever each forward movement, and avoid going too far around so that you get by the half-way line and thereby cause the spring in the rule to bulge on you and prevent the return of the lever.

After the circle is cut off of the strip you can put it back on the bender and go over it all the way around and true it up, you can also reduce the diameter in this way, by moving in the former head closer to the die than when it was made.

To make a small circle, say 3-8 inch in diameter, which is smaller than the mandrel of the cutter, and make it in one piece, you must guess the length, but do not guess the length and cut it off until you first bend the end to the desired diameter and trim it so it will be right when the circle is done, then estimate the length of rule to finish the circle, and at about the place where you think it will be ending, bend that also to the desired diameter and then cut off the piece. You will now have a piece with both ends bent to the desired diameter and will only have to finish up the middle part of the bending, and this do by clamping on the ends where it is already formed and not clamping on the middle of the straight part. If you have missed your guess on the length, try again, you will soon learn to be more accurate, and if you are making several keep one partly finished to cut-off by. Always use soft,

thin rule for small circles as it is so much easier.

The little hair of stock that will be left at the joint will suffice to keep the cut-out from sticking on the tympan, if you cut directly against the metal. If you have any tag board over the metal tympan on a circle cut-out it will cut through even the hair of stock at the joint and thus cause you bother with the scrap.

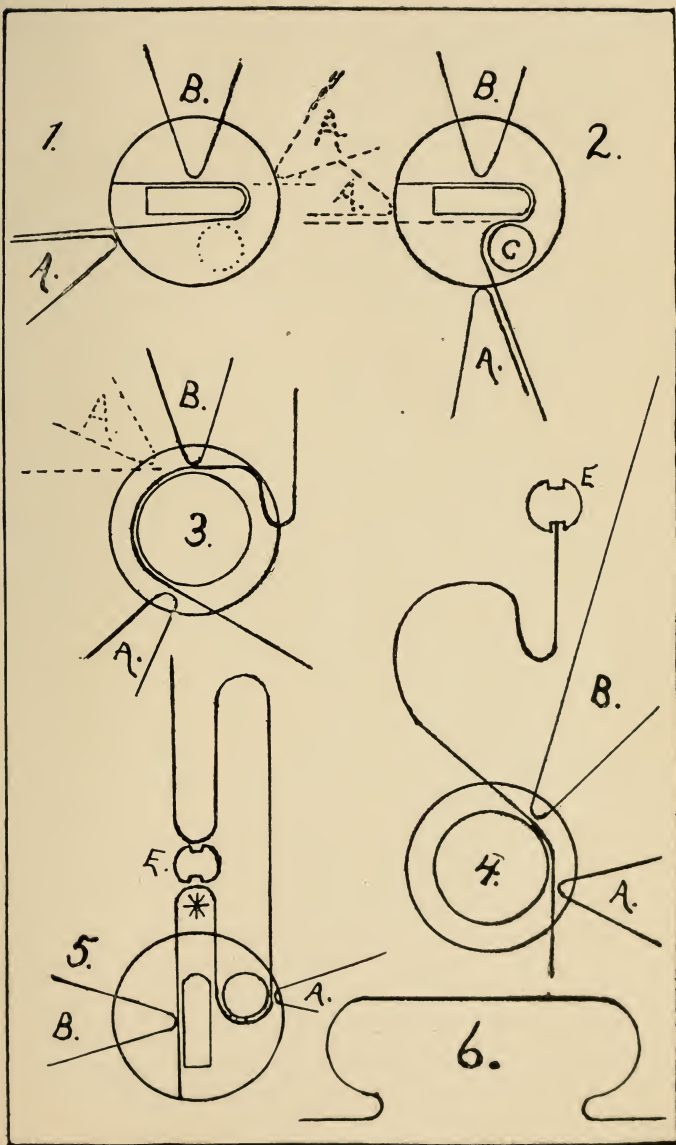
If you cannot make good circles the first crack out of the box do not blame the machine, because it is simply a matter of familiarizing one's self with the spring of the steel, and the positioning of the former heads.

If at any time there are any points that you wish to know, write the author freely, asking about them.

Also do not be selfish with any good things you may get wise to, as there are new things to be learned by all of us, and it is up to you to help make the next edition of "The Art of Die-Making" even larger and more valuable than this one is over the last one.

The die that has the one-fourth inch pin with it is the one used for making box hooks, and in combination with the other dies of **Box Hooks** the set will make any size hook you may want. The material for box hooks must always be soft steel as the harder rule will not stand the severe bending strains without breaking.

In making this explanation in connection with the diagram sketch on page 00. The letter A represents the movable former lever head; B the permanent clamp head, and the figures the differ-



ent progressive stages of the operations. The dotted lines show the position of former head and rule before bending.

If you want to make 50 right hand hooks and 50 left hand hooks, you first determine the length of the rule needed to make the size you wish, by taking note of the length of your trial piece. If it makes the right size, all well and good, if it doesn't you can add to or detract from it accordingly.

For the first operation as shown in figure 1, place the end of the rule even with the edge of the main body of the die, clamp it with B and then with A at the edge of the die make your bend around as far as the lever will go until it is against the other side of the die, as it will spring back some when released. Make this operation on the entire lot before proceeding further, and for the rights and lefts you have but to turn over the rule on half of them. If you wish to make your hooks with a very narrow throat as in fig. 5, you can take a hammer and with one crack close each hook up parallel after making this first operation, and before making the next one. For the second operation, as shown in fig. 2, place the piece with the lever A on the left side of it, and then before you clamp it with B put in the pin C and with the lever B even with the edge of the main body of the die bring it around to a point as shown in the sketch, which you may have the same each time by making a mark on the face of the machine. If you wish to make a very small hook you can bring it clear around as shown on the double hook in fig. 5.

Make this operation on the entire lot, also turning the face for the rights and lefts.

For the third operation, as shown in fig. 3, you can take any size die you want, thereby making as large a hook as wished for, and of course complete this operation on the entire lot in order to keep up the uniformity.

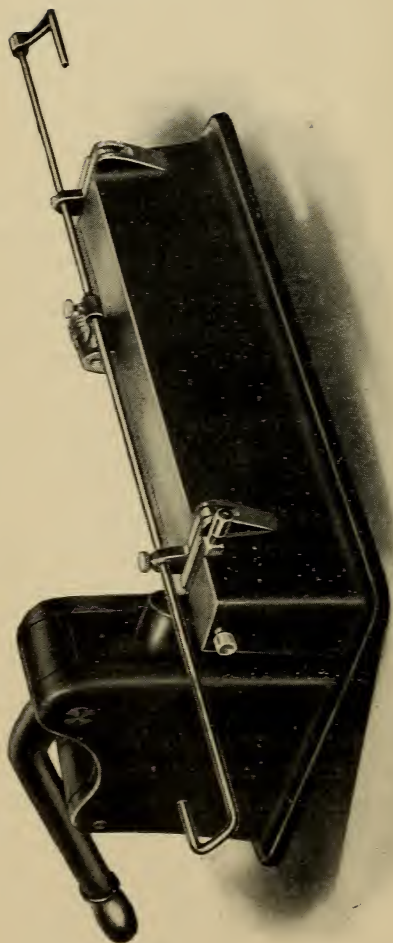
For the fourth operation, as shown in fig. 4, place the measure gage E at the desired position and thereby get all bends alike on this operation, which completes the hook, and although it may seem that there are a good many operations to go through in making them, it will surprise you how quickly 100 hooks can be turned out after you get the knack of it.

Be careful to keep the rule on its feet square, especially watch this while making the second bend, as the long end of the rule is apt to ride the adjusting nut on the former head.

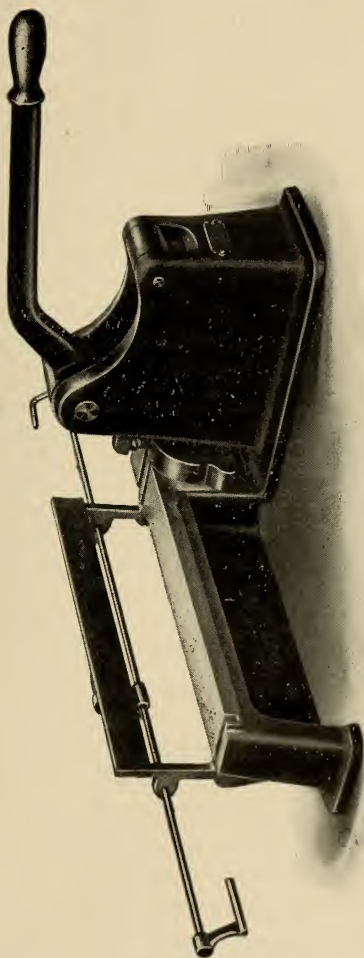
The illustration number 5 shows that by moving your rule back before making the second bend you may get any length hook you may desire. See star. Use the measure gage so as to get them all alike when making the long throat.

The illustration 6 shows a double hook, which is made in the same manner as the single hooks up to the the third operation, which completes them. You turn the rule face up and face down for the opposite ends in making.

You will find no trouble at all to make perfect hooks after a little practice. Large Laundry and Suit-box Hooks, in fact all kinds of special hooks can be made with the one-pin die.



“MULTIFORM” RULE CUTTER
Closed for straight rule



“MULTIFORM” RULE CUTTER
Open for Bent Rule

"Multiform" Rule Cutter

(PATENTED MARCH 21, 1911. FOREIGN PATENTS PENDING)

The "Multiform" Cutter was invented by Mr. J. A. Richards from a long-felt need of a cutter that would not only have some

Description. size to it, and plenty of clearance under the knife, but that would cut steel and brass rule, and cut it in any form it might be in, whether straight or round or any conceivable shape, and by the way the words of praise and commendation are coming in, it seems that the NEED has been supplied. The base of the machine is one solid piece and weighs in the rough, 50 lbs., and the left extension of the base has a planed surface 2 in. wide by 15 in. long that makes a very convenient straight edge and printers' anvil. The length overall is 21 1-4 in., width 14 in., height 9 1-4 in.

The straight rule gage shelf is graduated on the front edge and on the back edge, the front edge being for determining lengths between the gage block and the knife, and the back graduations being for the determining of lengths forward of the knife when the front extension gage is used. The front graduations also act in the same capacity for duplicating the measure when the rear extension is used. This gage shelf has milled notches in its top surface that are made to adjust the gage block to picas, (1-6 inches) and in addition to this positive adjustment the gage block has a micrometer stud which is subdivided

into six equal parts that gives an adjustment of one point ($\frac{1}{72}$ inch) one revolution of which gives a movement of 1 nonpareil or $\frac{1}{12}$ inch. These adjustments are all positive and yet all are made with one hand. Any length can be secured under 180 picas (30 inches) all with the same measuring device and controlled by the positive adjustments of the notched gage shelf and the micrometer stud gage block. Think of it—180 picas divided into points of positive measurement, on front, rear or main gage.

Another feature of the machine that is entirely new, and is approved by all who operate it, is the eccentric knife bar, which permits of the same knife cutting either a shear cut, for all rule, or a straight chopping cut for leads and slugs. The simple turning of an eccentric stud which has a knurled head changes the knife to the desired straight or shear cut. No double knife or gage, but the same knife and the same gage, with the same great latitude.

The gage shelf throws back out of the way entirely when it is desired to cut any other shape than the regular straight strip rule, and in cutting bent shapes the right angle surface of the machine is planed so as to make the same square cut, as if you were cutting straight rule. The clearance beneath this mandrel cutting knife is 4 inches, giving plenty of room for any shape of rule. The finest point in the entire machine, and the one upon which the strongest patent claims were laid, is the removable cutting mandrel, which may be taken out of the machine just as easily and quickly as it is possible to get

hold of it, and if you wish to cut something that is a complete circle or oval or closed up, this is a great feature, as a circle as small as 1-2 inch **may** be put on the mandrel and cut, and much smaller circles may be cut in partial circumference. All these and many other convenient labor-saving features will appeal to the busy printer and die-maker who likes to make every move count.

The cutter may be placed at any convenient point in the room, but if it is part of the "Multiform" Outfit, it should be as near

Position. as possible to the Bending Machine.

In fact the two should be on a roomy bench by themselves, neatly arranged with places for your steel rule and dies for the Bender, corks, and other material. If mounted in such a place, it is well to screw it down; before doing so, put it up and mark with a pencil the outline of the frame or base on the bench and then cut a slot about 2 inches wide and as long as the left extension of the base, to permit of the bent rule sticking down through the table. This you will find it is often necessary for it to do in order to cut off a piece after it is bent in some peculiar shape. A similar slot can be cut on the other side in line with the rule, but it need not be so long, or can be dispensed with without any great disadvantage.

The gage feature on the "Multiform" Cutter is one of the most wonderful that it is possible to conceive, and at first

Straight Cutting. glance you may not grasp the versatility of it. To cut

off, for example, a few pieces 10 picas long from a piece of rule 30 inches long, you will, as the most convenient method, use the front extension gage. By placing the front extension back against the knife, you will have a 1 pica or em or 1-6 inch already measured by virtue of the little offset in the end of the gage for supporting the end of the rule, with the gage rod back against the knife therefore, you place the gage block which has the screw-headed micrometer adjusting stud in it, back against the extreme left gage shelf hinge which places it at 1 on the back set of graduation figures, (figures for the front extension) now tighten the thumb screw in the gage block down to the gage rod and with the thumb screw in the gage shelf hinge loose you can move forward with the gage block (after raising it out of the notches) until you have moved up to 10 picas according to the front extension figures, which will naturally bring the front end of the gage rod also forward to 10 picas, then when the block is properly placed in the notches, you tighten the thumb screw on the left gage hinge, which secures the gage rod to the set position, after which you may release the thumb screw in the gage block and throw it back out of the way, giving you a clear shelf for the long 30-inch piece of rule from which you may then proceed to cut off as many 10-em pieces as you wish by projecting it forward under the knife each time. The same procedure will give you any length up to the full capacity of the front extension, and in addition to the picas you may, before you tighten the shelf hinge screw, get any

division of a pica down to a point by the use of the micrometer stud, which is divided into six equal parts which have each a positive set and are numbered from 0 to 5, one full revolution making a half pica, (nonpariel) or 1-12 inch.

For cutting off, say 3 picas, from a piece of rule which is 33 picas long, the most convenient way is to use the gage block itself on the shelf proper, without any respect being paid to the gage rod or the ends of it or the thumb screws on either, simply setting the gage block at 30 picas according to the graduations on the front edge of the gage shelf, and placing your piece of rule in position with the three ems projecting beneath the knife. The front extension should be out of the way enough to permit of the rule passing under it as far as desired, though no particular attention need be paid to it as to position.

To use the rear extension, which is for cutting any length longer than the main gage block will cut on the shelf, you bring the rear extension gage finger up against the left gage shelf hinge with the finger on the shelf, which will bring it back to 86 picas; (this finger when properly placed on the gage rod is just the opposite from the front return bend of the rod, which permits of the rod being used for its full length up against the front hinge, and not coming under the knife at all.) Now place the gage block towards the knife and if you wish to cut a length of, say, 106 picas you can put it down into the notches at any graduation mark, but preferably at 3, so as to become accustomed to it mentally,

then tighten the thumb screw in the block and with the hinge thumb screw loose, raise the block out of the notches and move rod and block back 20 picas on the shelf, putting it down at 23 picas; this you can readily see will add 20 picas to the positive 86 which will give you the desired 106 picas. If you want any points or a nonpariel in addition to that, use the micrometer, after which tighten up the screw on the shelf hinge and release the gage block screw and throw it back out of the way, allowing a clear shelf for the long length of rule. You of course take into consideration the 1 pica offset when using the extension on the rear as there is no allowance made for this as there is on the front graduations. This is very simple, as you brought the gage finger back to 85 which left the offset at 86, whereas if you were only going to cut some length that did not run off of the shelf, as for example 95 picas, you would cut directly against the end of the finger and pay no attention to the offset, which is for supporting purposes only when cutting longer lengths than the 96 on shelf.

Simply throw the entire straight rule shelf, with its gage, etc., back out of position and you

To Cut Bent Shapes have all the clearance in the world for the bent rule. If a circle is too small to go around with.

Or Circles out lifting out the mandrel do so, place the rule on it, and put it back. Always be careful to keep your rule square against the vertical face of the machine.

Be careful and do not try to cut steel rule with the eccentric on the straight-cut position. Also remember, a little oil does not "injure" a rule cutter when applied not more than once every "ten" years.

Knives can be mailed us for regrinding, for which a charge of 25c plus postage is made for the pair. New knives can be mailed promptly upon receipt of price. Mandrel, \$1; flat, 75c, Prepaid. Always give number and series of machine when ordering.

In putting in a new knife or replacing the knife after grinding, be sure that it cuts snugly against the mandrel knife edge, so as to insure a clean edged cut, without any burr. If any packing is necessary, use paper or copper thin spaces and be sure and cover the entire back of the knife, making holes for the screws, by taking a round-ended tool like the head of a machinist's hammer, which will cut through the material when it is laid over the holes.

When replacing the mandrel knife always see that it is placed back in the machine in correct position so as to avoid having the top knife come down on the curved fillet part of the mandrel, which it would do if the mandrel was not thoroughly in the proper position.

Press Work

If you have any universal presses in your office it is well to use them on the larger jobs, but the small Gordons or **Platen Presses** other makes of platens are plenty strong enough and a great deal more convenient to use for the little cut-outs, such as menu cards, programs, and small booklets, like "The 'Goose' That Lays the Golden Egg," which was cut out on an 8 x 12 C. & P. Gordon, after the work was all bound.

The larger makes of Universal presses, both in the John Thompson and the Galley, can be purchased with a removable brass platen with an added cost of only \$5.00, or it can be added very easily yourself by simply writing them for it and drilling the four screw holes. We have in our printing department a style No. 3, combination B, 14 x 22 Galley Universal, which has the removable brass platen for use in cutting and scoring this class of work. This press is the largest and heaviest of the combination printing presses, and costs less than the John Thompson press of a similar size by a considerable sum, and while we are not selling presses and not boosting any particular make, we are convinced that the heavy fly-wheel on the Galley we have makes it the best press for the work. Of course, you may have the convenience of a large cutting and scoring press without rollers; if so you are doubly well equipped.

There is on the market two makes that we

know of in the line of cylinder presses, built especially for cutting and scoring. The best one is built by the Cottrell Printing Press Company, and we understand it is giving very great satisfaction. We can give you full information about this press if you are interested, or you can write the builders. We should be pleased to handle your inquiry if you are interested.

We have yet to have some experience with the up-to-date, two-revolution presses in doing cut-out work, and while the author has had several years' experience as erector and pressman, with both the Miehle and the Century presses, he is not prepared to say if you could successfully deliver, either in the front or the back of the press, any complicated cut-out. The delivery is the only obstacle in the way of the front delivery presses having the stripper fingers, and perhaps that could be overcome by a temporary tumbler pin being arranged so as to drop the sheet in the back on a table arranged above the form. This it seems would be practical on the Miehle, which is fitted with the safety tumbler pin to again right the tumbler. Since the foregoing was written in the last edition of the die book, the author has seen even an old Campbell two-revolution, front delivery press fitted up with sheet iron blanket turning out some very complicated cut-out jobs for one of the largest lithograph houses in the United States, and delivering the sheets out over the stripper-fingers to the front jogger board, nicely, and without the catching of edges, as would be

expected.

But on the ordinary makes of drum cylinders the work is very simple, and is not much harder on the press than the regular form. Of course, if one had enough work to keep the press busy all the time, it would be policy to have one of the special built machines that have the heavy construction. The idea of using the old drum is simply to get a foothold in the work, and to show that the equipment you have is all-sufficient to get a start. In fact, they make good cutting presses for all time and cost but little to fix up.

To prepare a cylinder for the work you simply put on a zinc, sheet iron or brass tympan (preferably sheet iron), and follow the same make-ready as on the platens, and in delivering the work, if it is so very limber and easy to catch on the fly, you must stop the fly and have a couple of boys or girls to be on each side of the fly table and catch the sheets as they come out, doing away with the fly entirely, but this is only an occasional necessity.

If there is any margin that will permit, you can run little wires around the cylinder to assist the corks in keeping the die clean, the same as a pressman tapes his cylinder for keeping sheets taught.

If you have a large drum there is no limit to the size of the job.

If you have not the platen press having the brass cutting plate as mentioned, get a smooth sheet of zinc or sheet iron, large
The Platen enough to fit the platen of your press, and extend over a half

inch at the top and bottom. Have the tin-smith turn this half inch to an angle so it will be under your clamps. Use care and get a nice-fitting job of it. Zinc is nice for short runs of fancy jobs; of course, the same piece can be used over and over again for hundreds of jobs.

If this does not give you the proper impression you must always use pressboard or tin in building up underneath this plate, so as to avoid a springy platen surface, and save your plate from being destroyed. If you are working on a Universal, of course you simply adjust your impression bar to fit your job. Now take a sheet of manilla board, or, if there is no tag board, a piece of bristol two or three-ply will do, glue this to your platen all over, and take a piece of furniture or something and rub it down good. After it has set a little while put in your form (having first removed your rollers) and take an impression; then cut out the glued bristol at the places you wish to place your guides, so that the guides will glue directly on the platen and the bristol board will act as a protection from the stock getting under the bottom of the guides. Make your guides from a piece of pica rigglet, or better yet get some nice strips of poplar the right thickness and drive into the face of them small pieces of steel rule to act as tongs. Have the wood sufficiently wide so as to get a good hold with the glue and secure them firmly, as heavy cardboard will knock them off very easy, much too easy for the pressman's liking. For a small run you can use ordinary gauge pins and seal them down with

sealing wax to make a sure hold, or glue on quads.

Now to make the cutting rule work to the best advantage, you can ease off the cuts by taking your make-ready knife and beveling the bristol on both sides of the cut, down to the middle. This, when done properly, makes it easier on the press, but this need not be practiced for ordinary runs of short length. In fact, if you are using a zinc tympan plate for a short run of 25,000 or less, you can cut directly against the zinc and only have some paper glued on around the edge to glue your guides onto.

To make the trimmings come out with the cut-out: If they break off and want to remain behind, you can make a nick or two in the face of the rule with a file or another piece of rule pounded on it crosswise, in the places where it cuts them away too thoroughly. But be sure it is not a lack of corks that is making the trouble and tearing up the sheet. A thin piece of cork on the tympan will help sometimes, in case of circles sticking to tympan.

After the job is running nicely on the press, keep them jogged as straight as you can and it will facilitate the scrapping of the pieces. Do not try to scrap them one at a time, but take several, and holding them firmly you can break away the scraps as easily and nicely as one could wish for by a simple twist that you will soon acquire, 100 and more at a time.

If you have any holes to punch in the job, if it is a hanger or some simliar job, you can do this at the same time you cut them out by having a Bullock press punch. If you

have a good punch in your office you can use it, but the Bullock makes a good punch for ordinary jobs, and does it at the same time the work is cut or printed. We can sell you the Bullock punches at the same prices as the Type Founders' Specimen Books show.

If you are making a booklet cut-out, like the "Goose Book," and the die crowds the edge of the stock up so it does not look smooth and nice, you can put a solid block in the press and run them all through, pressing out the cut-out so it is nice and flat. The "Goose Book" was done in this manner, the block being filed away so as not to press out the wing.

You now have your job finished, and with the exception of a few pointers that may be of value in preparing of the printing before you make the dies, there remains nothing further to be said, as the great teacher is experience, and though we had all the information in the world at hand, we would not become adept at the Art unless we had the opportunity to try out the suggestions.

You must talk the work up and show your customers the illustrations in this book, and call their attention to the ever increasing amount of this work that is filling the store windows, and urge them to be among the pioneers in having some of it for their next banquet program, catalogue or the next home talent show that is given. If you are not handy with your pencil, perhaps your customer is, and can furnish his own sketch, for the little idea that will surely come to him if you present the cut-out proposition in the

right manner.

If the job offered is a large one do not hesitate to demand a little time, and get your engraver to submit you a sketch of the idea you have thought up, or let them help you think it up—that's what they are for. If you have an establishment that boasts its own artist, you are certainly able to be in the front rank with this work and make the artist's time doubly valuable.

If you keep boosting the work to every customer that comes in you will soon find that the customer will begin to buy, and when he does begin he will buy only of you, because thinking of a job of printing goes along with the thought of "here's a chance to try something in the new cut-out stuff," and presto, you have a job.

"Let the 'Multiform' Outfit multiply your profits."

Just a few pointers on the preparation of the work and the instructions will be quite sufficient to enable anyone with a fair knowledge of the printing trade to make a creditable showing.

As an aid to carry out any idea, you have at your command all of the type foundry cut and specimen books, the illustrations in the dictionary and, in fact, you can find almost anything you wish to illustrate, and by the use of a Pantograph you can enlarge it to any size you wish. We can sell you a good Pantograph for \$3.00, and every printer should own one. We also have cheaper ones as low as 50 cents.

If your job is such a one as the Puritan

hanger that is mentioned in the preceding chapters, which is a plate job, with the printing on both sides, you will bear in mind the fact that unless the customer is willing to pay for it as an irregular design, it is necessary to have both sides of the plate alike in shape, so that in backing up each other the die will cut them out alike. In doing this kind of a job—say 25M lots—it is economy to have two plates made, the original and an electro, and print both sides at once, as a work and turn, of course being sure to keep the same side guide on both runs, making a right and left feed, as it is next to impossible to cut stock accurate enough to get a proper register without reversing your side guide.

In having the drawings made, always allow a small amount of margin, more or less, for a variation of the die and the register, or on some classes of work you can add to the appearance by leaving a margin of white stock around the job. This at times is handy when the die is going to be quite fine to make.

Have an eye to the finished product before you start in. While you are running keep an eye on your register, by sticking your knife through on the several edges.

On the job like the basket for a picnic, illustrated elsewhere, you should make your die first, and then stick it on the press, and without any make-ready or any trouble, put in enough stock to get a cut-out from it. Take this and cut your stock for the job, allowing a small margin around it. Now also use it as a frame in which to set your matter in proper printing position; that is, have the

compositor keep it in hand to go by in setting the type, so as not to get outside the die. After the composition is up print the job, fold and stitch it at some point to keep it together, and then proceed to cut it out with your die in the manner described. The little booklet, entitled "The 'Goose' That Lays the Golden Egg," was made in the same manner, all printed and trimmed before it was cut out. But it was planned as a whole at the very beginning of the job, the same as any first-class office demands now-a-days.

For a window card like the "Gypsy Rover," as shown elsewhere, you make the pen and ink drawing with the size of your stock in mind (always keep the size of your stock in mind on all work), and then send it to the plate makers and have the etching made. After the plate is returned print up the required amount and proceed to make your die and cut out the job. Always print the work first, whether it is from a plate or a plain cut-out, and if it is a plain cut-out, you must have a trial cut-out from the die so as to place your printing properly. Of course, there are times when a simple cut-out that will not have any too rugged edges to feed, can be cut out first while the composition is in progress, if you have the job well planned and it is rush.

In closing, the author wishes to say that any time he can be of assistance to owners of a "Multiform" Outfit, you have but to command. And please do not forget the foreword, to send in anything that will be interesting and helpful to your fellow-craftsmen for the next issue of "The Art of Die Making."

As an aid to die making buy a scroll saw. Several makes are illustrated on other pages. It is not only useful in making dies, but saves time and does the mortising and trimming of cuts to perfection. The best is cheapest of course, but they are all good value and you can make no mistake.

Price List of Materials

The quality of our materials is the very best that can be produced, and if you find that in any instance our price is higher than others, it is because of the better value given. Our motto is: "The Best is Cheapest."

Two-point cutting rule, .923 high, .029 thick, soft or hard; 2-point cutting rule, .937 high, .029 thick, soft or hard; 2-point scoring **Rule** rule, .918 high, .029 thick, soft or hard.

In quantities of 100 feet or less, 8 cents per foot; 500 feet or more than 100, 6 cents per foot.

The above is the standard rule in general use, and we furnish 2-point .937 soft with Outfits.

1½-point cutting rule, .918 high, .021 thick, special soft for fancy work; 1½-point cutting rule, .937 high, .021 thick, special soft for fancy work. In quantities of 100 feet or less, 10 cents per foot. Special prices for larger amounts.

This rule is made especially for us, and is for such work as the cut and scored lamp shade, and other fine work that requires a thin rule, of extra good quality. A quantity of this rule should be on hand for fine work at all times.

We also carry, or can make prompt shipment from the factory, anything in the rule line, no matter how thick, how high, or any temper, but we do not list these, because for general purposes it simply is confusing to

the trade, as the man who is just starting into the work does not know what to select.

We carry a full line of die boards in two kinds, made especially for us by the Hamilton

Mfg. Company, which statement

Die Board should convince any prospective buyer that what he gets will be

right. For general purposes we have the smooth, clean, free-from-knots Beechwood, which is the best cheap material for the purpose that can be obtained. It comes in assortments of two-foot lengths, 3 to 10 inches wide, the proper thickness, and sells for \$10.00 per square feet, f. o. b. Albion or the factory. Less than 100 feet, 12 cents per foot.

For the fine, fancy die work we recommend our made-to-order, 5-ply laminated die board, which can be furnished in any desired size, and which is strong and firm and does not require that you allow so much margin when making a die to strengthen it. In lots of 100 feet, any sizes you may select from the standard list, or made to special sizes, \$35.00 f. o. b. Albion or the factory. Less than 100 feet, 40 cents per square foot.

The following are the standard stock sizes: 12 x 24, 16 x 24, 24 x 36, 18 x 24, 30 x 36, 30x50, 30x60. Thirty inches the narrow way is the largest that can be made

We always send samples of these woods with each "Multiform" Outfit, and while it is a simple matter for you to get suitable board from any mill in your city, you will feel well repaid if you order a quantity of this special board, as it is so beautiful and uniform, and free from knots and imperfections.

Our Die Woods are the finest that can be procured, all clear selected stock and free from imperfections of consequence, and while we cannot guarantee our woods against warping, we can safely say that they are as free from this trouble as it is possible to have them.

We have found that warping is almost invariably due to the way the wood is handled after being received by the customer. The wood being unfinished and the pores open, it readily absorbs moisture, and if exposed to the atmosphere on **one side only**, the wood will surely warp, no matter what kind it is or what the construction may be. Die wood should therefore be kept in the original cases, covered with paper or other material, with a weight on top. After a die is made it is a good plan to oil the wood thoroughly, the same as printers' wood furniture is oiled, which will protect it from warping so badly, as it might otherwise do. Dies can be used for years if taken care of properly, and are often picked up as pure "velvet" from the rack, as heretofore stated.

We always carry in stock a large quantity of the small round corks, like the samples you received with your "Multiform" **Cork** Outfit. They are the best for the purpose that can be secured, and not of inferior grade of cork, which does not have the resiliency of the good grades

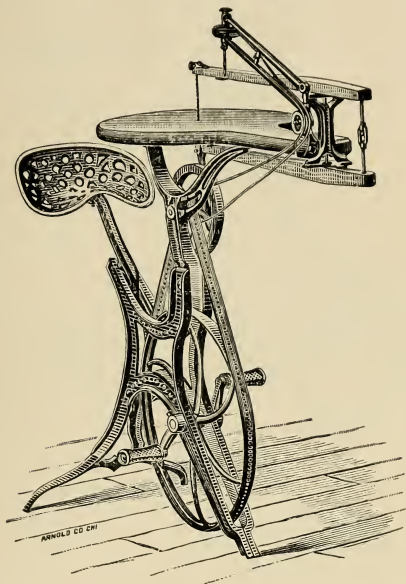
In 1,000 lots, \$2.75 f. o. b. Albion or Chicago; 100 lots, 35 cents, postage prepaid.

We also have sheet cork in extra good quality that is very convenient at times for cut-

ting strips for long, narrow parts of a die.
This comes in sheets, 4 x 12 inches, at 25 cents
per sheet, 4 for \$1.00, prepaid.

Velocipede Scroll Saw

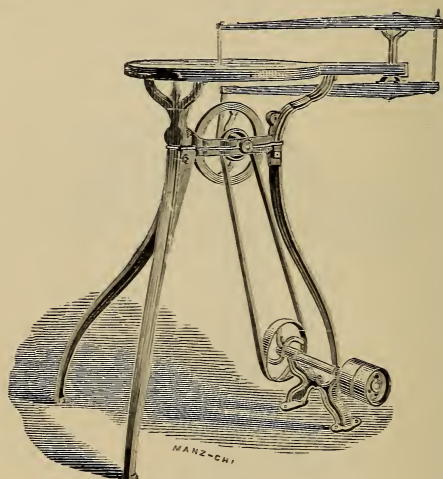
PRICE, WITH BORING ATTACHMENT, \$20.00
WITHOUT BORING ATTACHMENT 18.00



We recommend this machine very highly for a moderate priced saw. It has about the same capacity as Scroll Saw No. 7, but this is preferred by many on account of the velocipede foot power, and because of its boring attachment.

The swing around the blade under the arm is 24 inches. The length of blade is 7 inches. The table and arms are of hard maple. The frame is of cast iron. The balance and drive wheels run on steel arbors. The machine weighs 90 pounds. Boxed for shipment, 130 pounds. We include one dozen blades with each machine.

No. 7 Power Scroll Saw



The above cut shows our No. 7 Scroll Saw, arranged with a counter-shaft. The price of counter-shaft, including the connecting band-wheel on the machine, is \$10. The price of No. 7 Scroll Saw, arranged with counter-shaft only, (no foot power) is \$20.00. The best cheap power saw on the market.

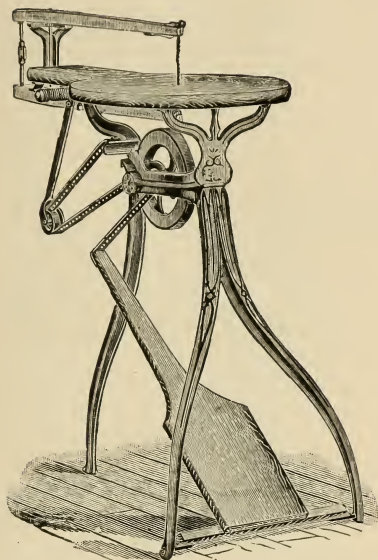
Do not confuse any of these scroll saws with the amateur saws of your boyhood.

Boring Attachment for Velocipede Saw

The boring attachment can be furnished at any future time, if not desired when machine is ordered. One 3-16 bit is included with the boring attachment. We can furnish extra bits at the following prices, each: 1-16, 15c; 3-32, 15c; 1-8, 20c; 5-32, 20c; 3-16, 25c; 7-32, 30c; 1-4, 35c.

No. 7 Scroll Saw

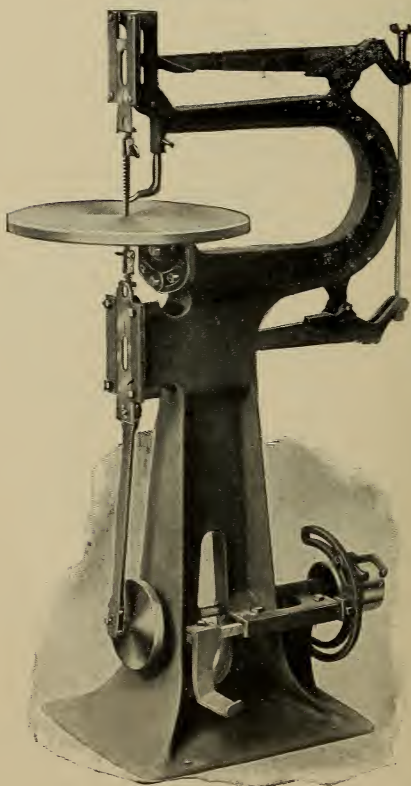
PRICE, \$15.00



We warrant it to be well made, of good material and workmanship. The ordinary rate of speed when sawing is from 800 to 1200 strokes per minute. The swing around the table, under the arm, is 24 inches. The length of the blade is 7 inches. The table and arm are made of hard maple. The frame is made of cast iron, strong, yet light. The balance wheel runs on a steel arbor. The machine weighs 60 pounds. Boxed, for shipment, 95 pounds. We include 1 dozen blades with each machine.

Grammes Scroll Saw

\$65.00 F. O. B. FACTORY
ALLENTOWN, PA.



A first class power saw, the same as used in our die making department. It is useful for all kinds of mortising and other work in a printing establishment. You can make no mistake in ordering a high priced saw.



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